AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of the claims

1. (original) An integrated micro-device for analysis of a biological specimen, comprising:

a) a support comprising:

i) a first tank;

ii) a buried channel formed inside said support; and

iii) a detection chamber;

wherein the first tank, the buried channel, and the detection chamber are fluidly coupled and wherein the first tank is accessible from outside of said support.

2. (original) The integrated micro-device of claim 1, further comprising a micropump on said support for moving a specimen from the first tank to the buried channel and to the detection chamber.

3. (original) The integrated micro-device of claim 1, further comprising a heater on said support.

4. (original) The integrated micro-device of claim 1, further comprising an electrode on said support.

5. (original) The integrated micro-device of claim 1, further comprising a second tank, fluidly coupled with the buried channel.

6. (original) The integrated micro-device of claim 1, wherein said support comprises a material with high thermal conductivity.

7. (original) The integrated micro-device of claim 1, wherein said support comprises silicon.

8. (previously presented) The integrated micro-device of claim 1, further comprising a heater, an electrode, and a micropump for moving a specimen from the first tank to the monolithic buried channel to the detection chamber, wherein said support comprises a material with high thermal conductivity.

9. (original) The integrated micro-device of claim 8, wherein said support comprises silicon.

10. (original) An integrated device for analysis of nucleic acid, said device comprising a support carrying i) a first tank for introducing a biological specimen into said support, ii) at least one pre-treatment channel, iii) a buried channel inside said support, and iv) a detection chamber, each being in fluid connection with each other.

11. (original) The device according to claim 10, further comprising at least one second tank for introducing a reagent in fluid connection with either the first tank or the pretreatment channel or the buried channel and comprising a mixing chamber.

12. (original) The device according to claim 11, characterized by a detection circuit associated with said detection chamber and formed inside or on said support.

13. (original) The device according to claim 12, characterized in that said support comprises semiconductor material.

14. (original) The device according to claim 13, characterized in that said support is operably mounted on a printed-circuit board.

15. (previously presented) The device according to claim 14, characterized in that said pre-treatment channel is formed above said support and is delimited laterally by a containment structure and on top by a protective plate that covers said containment structure.

16. (original) The device according to claim 15, wherein said containment structure is of polymeric material.

17. (original) The device according to claim 16, wherein said pre-treatment channel comprises at least one dielectrophoresis cell.

18. (original) The device according to claim 17, characterized in that said protective plate comprises a conductive layer.

19. (original) The device according to claim 18, wherein said detection chamber is laterally delimited by said containment structure and is coated by said protective plate.

20. (original) The device according to claim 19, wherein said protective plate is of a transparent material.

21. (original) The device according to claim 20, characterized in that said protective plate is of conductive glass.

22. (original) The device according to claim 17, wherein said dielectrophoresis cell comprises an electrode grid forming an electrostatic cage with said protective plate.

23. (original) The device according to claim 10, 17, or 22, further comprising a micropump.

24. (original) The device according to claim 23, characterized in that said micropump is a vacuum pump.

25. (original) The device according to claim 24, wherein said micropump comprises a second support of semiconductor material accommodating fluid-tight chambers set at a preset pressure and connectable to said detection chamber.

26. (original) The device according to claim 25, further comprising a suction channel connecting said detection chamber to said micropump.

27. (original) The device according to claim 26, wherein said fluid-tight chambers are sealed by a diaphragm openable electrically.

28. (previously presented) The device according to claim 27, wherein said diaphragm has a thickness not greater than 1 μm.

29. (original) The device according to claim 28, wherein said micropump comprises electrical-opening means for opening said diaphragm.

30. (original) The device according to claim 29, characterized in that said electrical-opening means comprise at least one first electrode and, for each fluid-tight chamber, a respective second electrode, said diaphragm being arranged between said first electrode and a respective one of said second electrodes near an inlet of each said fluid-tight chamber.

31. (original) The device according to claim 30, further comprising a first voltage source, connectable to said first electrode of said micropump and supplying a first voltage, and a second voltage source selectively connectable to one of said second electrodes of said micropump and supplying a second voltage.

32. (withdrawn) A process for manufacturing an integrated device for nucleic acid analysis, comprising the steps of:

a) forming at least one first buried channel inside a body of semiconductor material; and

b) forming at least one second channel on top of said body, said second channel being at least partially arranged on top of said first channel.

33. (withdrawn) The process according to claim 32, in which said step of forming at least one second channel comprises the steps of:

a) depositing a polymeric material layer on top of said body; and

b) defining said polymeric material layer so as to form a containment structure delimiting said second channel.

34. (withdrawn) The process according to claim 33, comprising, before said step of forming at least one second channel, the steps of:

a) depositing a heater on top of said body;

b) forming, on top of said body, a first base incorporating said heater, and a second base; and

c) depositing electrodes on top of said first base and detectors on top of said second base.

35. (withdrawn) The process according to claim 34, wherein said step of defining said polymeric material layer comprises forming a chamber around said detectors and in fluid connection with said first channel.

36. (withdrawn) The process according to claim 35, comprising the steps of:

a) functionalizing said detectors; and

b) closing said chamber with a protective plate.

37. (withdrawn) The process according to claim 36, wherein said protective plate is transparent.

38. (withdrawn) The process according to claim 36, wherein said protective plate is conductive.

39. (withdrawn) The process of claim 32, wherein said semiconductor material comprises silicon.

40. (withdrawn) A method of amplification, comprising amplifying a target nucleic acid in a buried channel inside a substrate having high thermal conductivity, and detecting an amplified nucleic acid on a detector on said substrate, wherein the detector is fluidly connected to said buried channel.

41. (withdrawn) The method of claim 40, further comprising pretreatment of a cell sample to release said target DNA for amplification, said pretreatment occurring in a pretreatment channel that is fluidly connected to said buried channel.

42. (withdrawn) The method of claim 41, further comprising a second pretreatment of a cell sample to separate target nucleic acid-containing cells from non-target nucleic acid-containing cells in said pretreatment channel.

43. (withdrawn) The method of claim 42 wherein said amplification occurs by heating said target nucleic acid using an resistor integrated on said substrate.

44. (withdrawn) The method of claim 43, wherein said detecting occurs with an sensor integrated on said substrate.

45. (original) A portable device for analysis of a biological material, said portable device comprising:

a) a printed circuit board;

b) a disposable support having a buried channel therein and an inlet port accessible from outside of the disposable support, and a sensor placed thereon;

c) said disposable support and said sensor operably coupled to said printed circuit board.

46. (original) The portable device of claim 45, further comprising a heating element on said disposable support and operably coupled to said printed circuit board.

47. (original) The portable device of claim 46, further comprising software and control elements to control said sensor and said heating element.

48. (original) The portable device of claim 47, further comprising a detecting chamber on said disposable support and fluidly connected to said buried channel.

49. (original) The portable device of claim 48, further comprising a micropump integral to said disposable support and fluidly coupled to said buried channel.

50. (original) The portable device of claim 49, further comprising a sample injection system for accepting a biological sample and injecting it into said inlet port.

51. (original) The portable device of claim 50, said disposable support further comprising one or more pretreatment channels fluidly coupled with said buried channel.

52. (original) The portable device of claim 51, further comprising a user interface to direct said software and control elements.

53. (original) The portable device of claim 52, wherein said detecting chamber further comprises a CMOS detector.

54. (new) The integrated micro-device of claim 1, wherein said buried channel is approximately 200 μm wide by 150 μm deep.